

# Incorporating Making into University Courses for Teachers



Practices from Three CSU Campuses: CSUS, SDSU, and SSU

# Introduction to the Panelists



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# Overview of Making and Makerspaces in Education

Making vs. Design Thinking

A Maker Mindset

Why Making in PK-12 education?

Our Programs

Affordances and Constraints

# Making in Education



- \* Making is viewed as the democratization of STEM and project-based learning because makers transform from novices to experts while conceiving, designing, and making what matters to them (Rosenfeld Halverson & Sheridan, 2017)
- \* Design Thinking = One Form of Making in Formal Spaces

# A Maker Mindset

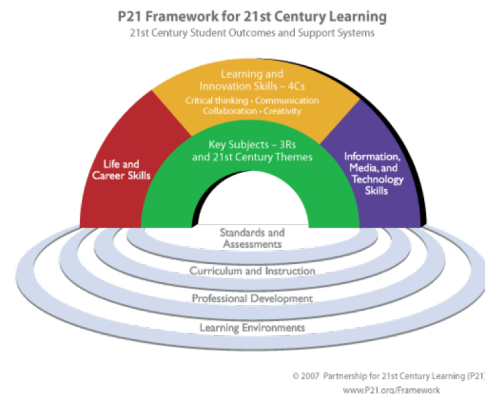
1. a sense of curiosity
2. an interdisciplinary approach to challenges
3. social-emotional competence through play
4. a disposition to share and collaborate
5. a growth mindset
6. resilience in the face of frustration  
(Regalla, 2016).

**CULTIVATING THE  
MAKER MINDSET**

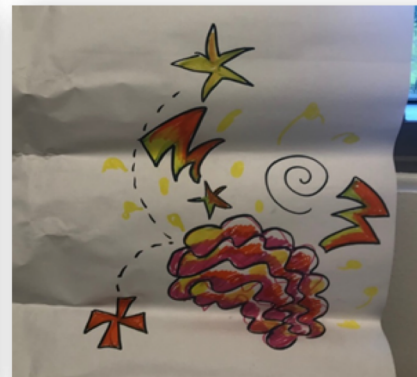
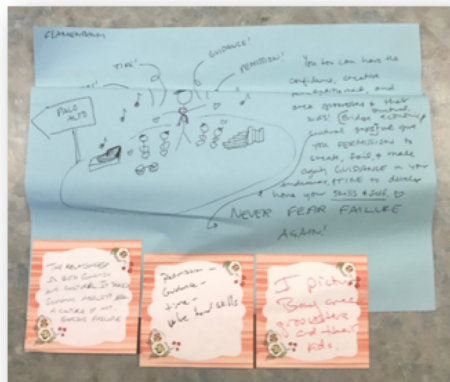


# Why Making in Education?

- Alignment with NGSS and Common Core State Standards
- Develop 21st Century Skills, including creativity, group work, problem-solving
- Cultivate a maker mindset
- Engage students in learning and having fun during learning



# Sacramento State University



# Design Thinking Unit Plan



# Ask, Solve, Reflect

## ASK

- Mini-Ethnographic Study
- Empathy Lesson
- Identify a Problem Rooted in the Students' Context

## SOLVE

- Develop Content Knowledge
- Connect to Social Justice Domains and Standards (Tolerance.org)
- Facilitate Culturally Sustaining Projects using 21st Century Tools

## REFLECT

- Reflection Lesson
- Formative Assessment
- Praxis

# Ask

- What were the key takeaways from your Mini-Ethnographic Study?
- [Help your students build empathy about a problem by developing an empathy lesson](#)
- Identify a Problem Rooted in the Students' Context





# Solve

Consider the problem that you have decided to address. How might you:

- develop students' content knowledge?
- incorporate the Perspectives for a Diverse America SJ Framework?
- develop 21st Century Learning and Innovation Skills?
- facilitate students creation of culturally sustaining projects?



# Reflect

Reflect on your students' designs.  
How has Making supported your  
students':

- Learning of 21st Century Skills?
- Your practice as a Culturally Sustaining Pedagogue?
- More positive identity processes?



# Proposed MA Maker Education

MA in Education: Special Programs

California State University, Sacramento

The program will engage students in a 30-credit program designed to develop critical knowledge of making, the maker movement, and Maker Education.

We will examine the ideas and practices associated with educational reforms that emphasize making as an ethos of interest-driven do-it-yourself (DIY) learning and culture.

# Proposed MA Maker Education

MA in Education: Special Programs

California State University, Sacramento

## Learning Outcomes

- Provide opportunities for students to engage in creative discovery and problem-solving within and beyond the classroom
- Connect students in the program with mentors and collaborators from the maker community
- Leverage CSUS's new makerspace in curriculum development

# Proposed MA Maker Education

MA in Education: Special Programs

California State University, Sacramento

## Learning Outcomes

- Provide a foundation in theoretical and practical perspectives on Maker Education
- Critically examine the ethos and tools needed to develop makerspaces
- Cultivate and strengthen students' abilities to develop 21st Century Learning and Innovation skills.

# Proposed MA Maker Education

MA in Education: Special Programs

California State University, Sacramento

## What are the Course Offerings?

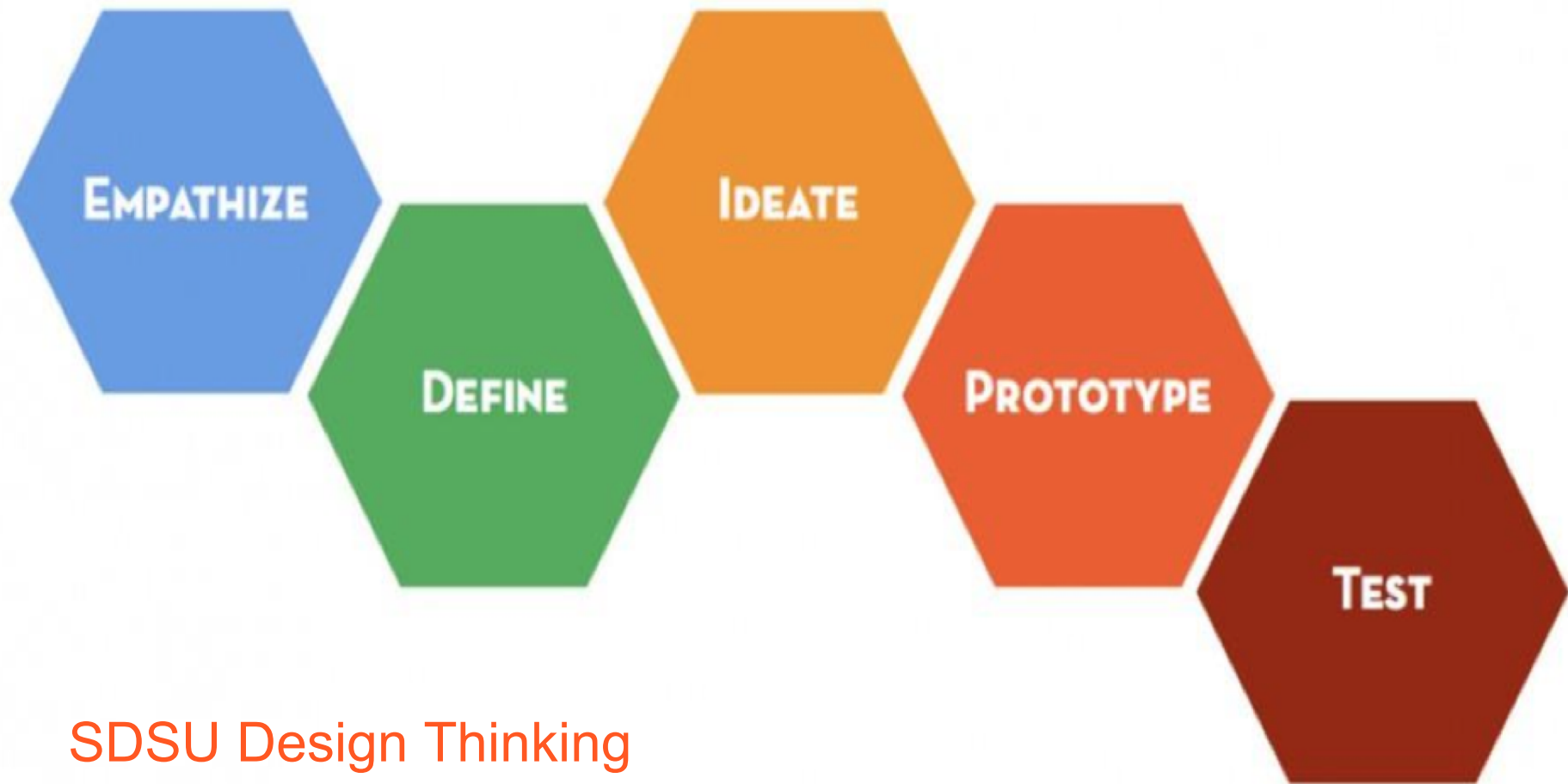
- Maker Theory and Practice
- Project-Based Learning and Assessments for Maker Educators
- Pedagogy for Learning and Innovation
- Educational Research Methods for Technology and Transformation (EDTE 250)
- Practicum in Maker Education
- The Anthropology of Making
- Makerspaces
- Teaching and Learning in a Makerspace
- Portfolio

# San Diego State University--Donna Ross



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UNIVERSITY



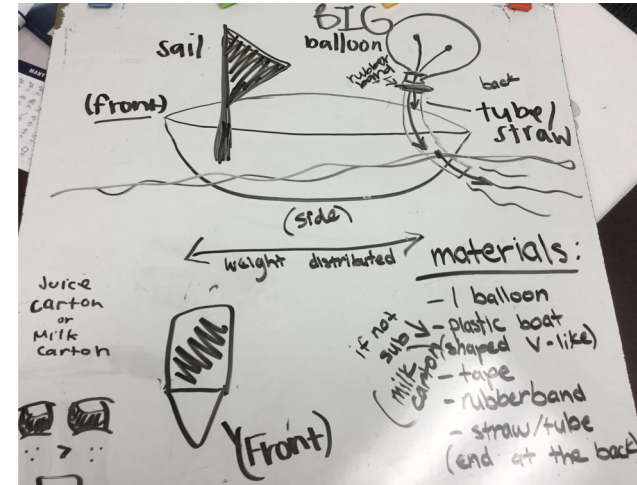
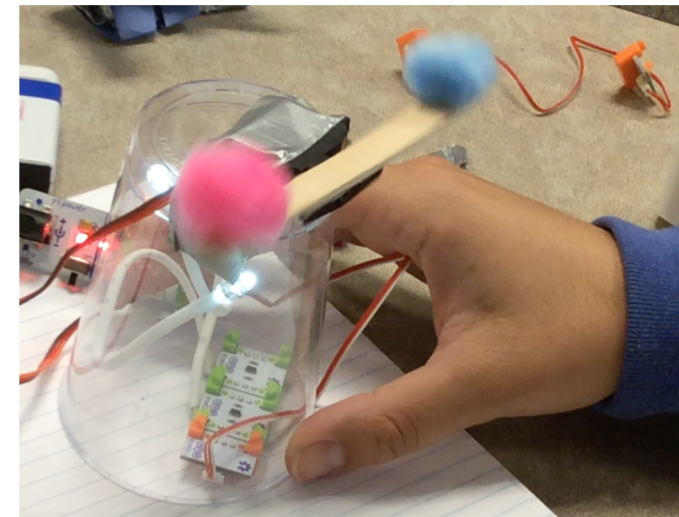


SDSU Design Thinking



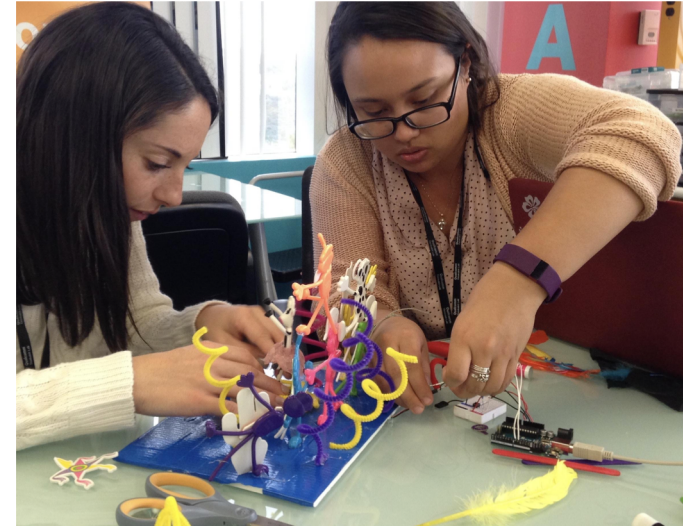


## SDSU -- Aztec Science Camp



# SDSU Credential Courses

- Science Methods
- Educational Technology (within foundations series)
- Not all cohorts receive same opportunities





# SDSU Graduate Course for Teachers

Elective course--current topics in STEM education--3 unit course



# SDSU Upcoming Certificate Courses

- Modeled after Sonoma State's program
- 1 unit 799 courses
- Understand the principles of making
- Learn pedagogical practices for making
- Up to 5 courses (still in negotiation)
- Designed for formal/informal educators, school administrators, and library staff





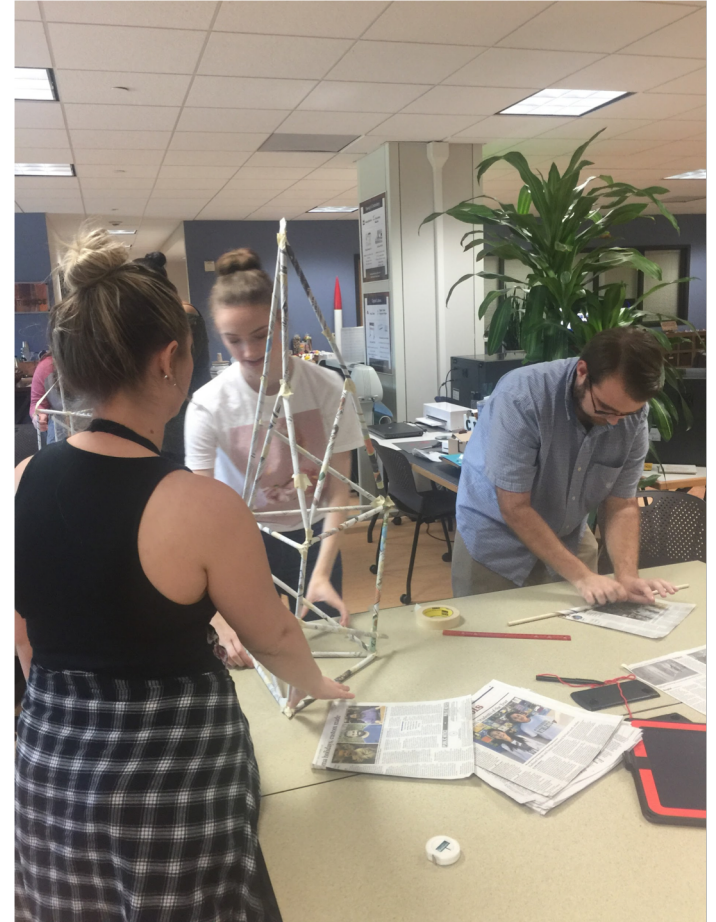
Sonoma State U

# SSU Preparing Teachers

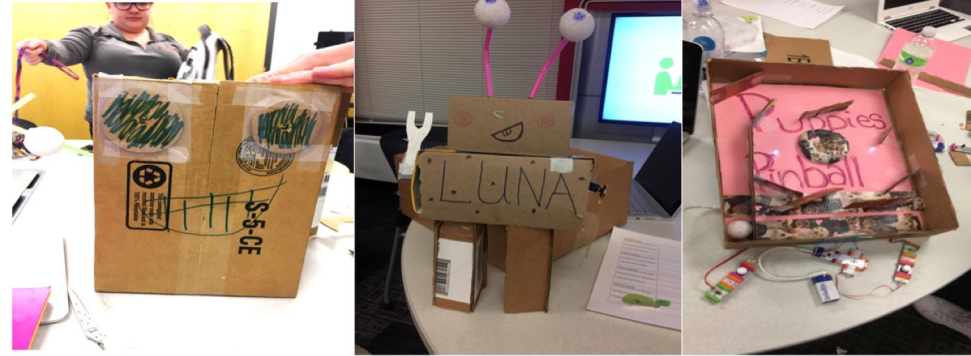
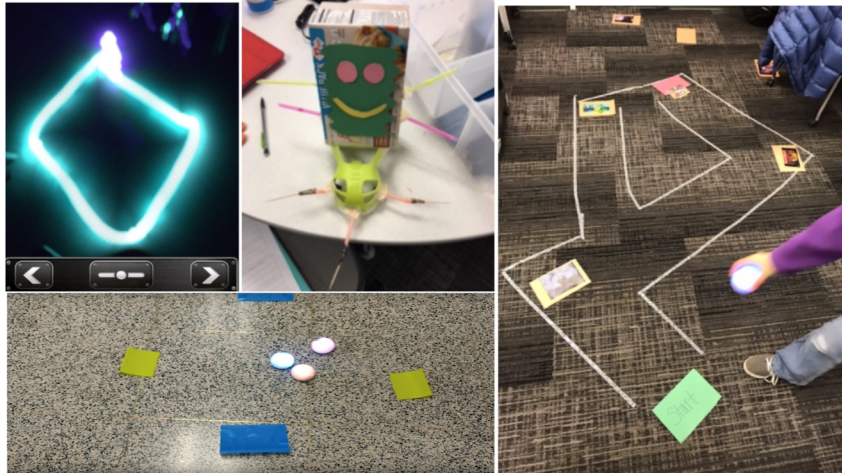




# SSU Workshop



# SSU Course



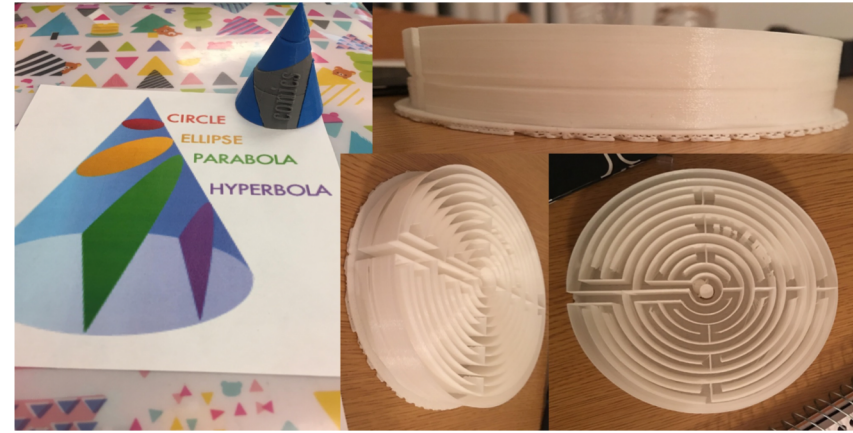
**Robots with Different Designs**



**Lil' Breezy with Different Designs**



# SSU Course



# SSU Maker Educator Certificate

As a result of completing the Maker Educator Certificate Program, participants will...

- Understand the core values and principles of Making
- Learn pedagogical practices for empowering learners to explore Making and a Maker mindset in a learning environment
- Design an action plan for implementing Maker activities in a learning environment
- Begin to consider ways to integrate Making in the classroom
- Begin to align Maker projects with CCSS and NGSS
- Become part of a Maker network
- Receive mentorship from local Maker educators, including SSU faculty and K-12 maker teachers

Courses:

Introduction to Making

Making for Educators

Maker Professional Development

Making Capstone Project

# Addressing Challenges to Incorporating Making into Teacher Education

- Find time in the teacher preparation programs
- Need more faculty involvement
- Need models of how Making fits with curricula and standards
- Attitude that we need everything to get started
- Awareness and Maker Mindset

# Equity in Making and Makerspaces

- Prototypes promoted in the MAKE magazine and maker community
- Gender issues in making and STEM education
- Making for non-dominant youth in under-resourced schools and communities
- Solving problems that are personally and community relevant

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Q & A

thank  
YOU  
so  
much

